

## **PART 1: A Damage and Radar Overview of the New Year's Eve 2010 Tornado Outbreak**

*Fred H. Glass*

*National Weather Service St. Charles, Missouri*

During the morning and early afternoon hours on New Year's Eve - 31 December 2010, an outbreak of tornadoes occurred across the middle Mississippi Valley Region. Twelve tornadoes were documented within the National Weather Service St. Louis County Warning Area (WFO LSX CWA), including one high-end EF-3 tornado which produced a fatality in Sunset Hills, Missouri and another high-end EF2 tornado in Robertsville, Missouri. There were several unique aspects of this cold season tornado outbreak: first, all but one of the twelve tornadoes was produced by a quasi-linear convective system (QLCS), and second, the sheer volume of tornadoes produced by a QLCS. The 12.4 mile path length of the Robertsville EF-2 tornado was also particularly long for a QLCS tornado.

The QLCS resulted from the upscale growth of two discrete tornadic supercells originating in southwest Missouri. Increased availability of radar data due to the Automated Volume Scan Evaluation and Termination (AVSET) capability on the KLSX WSR-88D and data from the St. Louis Terminal Doppler Weather Radar (TSTL TDWR) provided high-resolution radar sampling both in real-time and for post-event analysis. The close proximity of the QLCS to the TSTL TDWR and KLSX WSR-88D also afforded detailed low-level radar views, which at times were at or below the cloud base. As many as six mesovortices (mesocyclones) were clearly identifiable at one time within the QLCS, with three associated with tornadoes on the ground simultaneously. The growth and structure of the QLCS, evolution of the mesovortices, and association with the documented tornadoes will be presented. Reviews of the environmental characteristics for this event as well as the warning strategies and operational decisions employed will be given in several companion presentations.